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Application No. 10/042,181

A¹ Cont'd
~~a second electrode connected to said substrate, to form said data storage element.~~

10. (Amended) A data storage element, comprising:

a substrate comprising a semiconductor material having a source region and a drain region formed in a surface of said substrate;

A²
a layer of metal oxide disposed upon said surface of said substrate and between said source region and said drain region, said metal oxide comprising at least one metal which has a plurality of oxidation states;

a conductive layer disposed upon said layer of metal oxide;

a first electrode electrically connected to said conductive layer;

a second electrode connected to said source region; and

~~a third electrode connected to said drain region, to form said data storage element.~~

24. (Amended) A memory, comprising:

A³
a rare-earth based memory element for storing data based on hysteresis and
~~current-voltage characteristics thereof.~~

Please add the following new claims:

A⁴
31. The data storage element of claim 1, wherein the metal oxide layer comprises an active element that changes internally as a function of an applied voltage.

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32. The data storage element of claim 31, wherein said applied voltage to said active element results in a predetermined current-voltage profile.

33. The data storage element of claim 1, wherein when a voltage is applied between the first and second electrodes, beyond a threshold voltage, charge is accumulated in the metal oxide layer, thereby shifting current-voltage and capacitance-voltage characteristics, and

wherein upon reversal of the applied voltage, beyond a second threshold voltage, the charge in the metal oxide layer is discharged, thereby restoring original current-voltage and capacitance-voltage requirements.

34. The data storage element of claim 10, wherein the metal oxide layer comprises an active element that changes internally as a function of an applied voltage.

35. The data storage element of claim 34, wherein said applied voltage to said active element results in a predetermined current-voltage profile.

36. The data storage element of claim 10, wherein when a voltage is applied between the first and second electrodes, beyond a threshold voltage, charge is accumulated in the metal oxide layer, thereby shifting current-voltage and capacitance-voltage characteristics, and

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wherein upon reversal of the applied voltage, beyond a second threshold voltage, the charge in the metal oxide layer is discharged, thereby restoring original current-voltage and capacitance-voltage requirements.

37. The memory of claim 24, wherein said memory element comprises a metal oxide layer on a substrate, and

wherein the metal oxide layer comprises an active element that changes internally as a function of an applied voltage.

38. The memory of claim 37, wherein said applied voltage to said active element results in a predetermined current-voltage profile.

39. The memory of claim 24, wherein when a voltage is applied to said memory, beyond a threshold voltage, charge is accumulated in the memory element, thereby shifting current-voltage and capacitance-voltage characteristics, and

wherein upon reversal of the applied voltage, beyond a second threshold voltage, the charge in the memory is discharged, thereby restoring original current-voltage and

capacitance-voltage requirements.--
